

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION**

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| NATIONAL INSTITUTE FOR STRATEGIC TECHNOLOGY ACQUISITION AND COMMERCIALIZATION (NISTAC), <i>Plaintiff</i> | § § § § § § § § § § | CASE NO.: 11-cv-11039-GCS-LJM Hon. George Caram Steeh Jury Demand |
| v. NISSAN NORTH AMERICA, INC., et al <i>Defendants</i> | | |

PLAINTIFF'S RESPONSE BRIEF ON CLAIM CONSTRUCTION

I. INTRODUCTION

In this Response Brief, Plaintiff National Institute for Strategic Technology Acquisition and Commercialization ("NISTAC") responds to the Defendants' proposed constructions for the disputed claim terms of U.S. Patent No. 5,313,919 ("the '919 Patent") and U.S. Patent No. 5,239,955 ("the '955 Patent"). These are the only two patents-in-suit, given the recent stipulated dismissal of NISTAC's claims as to U.S. Patent No. 5,482,637 ("the '637 Patent").

As discussed below, two improper but recurring themes underlie the Defendants' proposed claim constructions: (1) Defendants impermissibly import limitations from the specification and/or preferred embodiments into the claim terms; and (2) Defendants add limitations that are improperly focused on *how* a claimed element looks or is made rather than focusing on *what* defines the claimed element. Both of these approaches are improper, as set forth in settled precedent discussed herein and in NISTAC's opening brief on claim construction. The primary motive behind the Defendants' recurring use of these improper approaches to claim construction is that they trying to enhance their non-infringement positions by altering the scope of the patent claims in ways that were not intended by the inventors and not supported by the

relevant intrinsic and extrinsic evidence. Accordingly, NISTAC urges the Court to adopt NISTAC's proposed claim constructions as set forth below.

II. PROPER CONSTRUCTION OF THE DISPUTED CLAIM TERMS

1. "relieved"/"unrelieved," "reservoirs of oil," and "lands"

The first set of claim terms discussed herein are three terms: "relieved / unrelieved," "reservoirs of oil," and "lands." As set forth below, NISTAC's proposed constructions are reasonable and do not suffer from the infirmities injected by Defendants' improper approach to claim construction.

a. **"lands"** – found in the '919 Patent (Claims 2, 6, 9) and in the '955 Patent (Claims 4, 5, 10, 12, 16, 18, 19, 22)

| Claim Terms | Defendants' Proposed Constructions | NISTAC's Proposed Constructions |
|-------------|---|--|
| "lands" | "unrelieved portions of the piston skirt surrounding the relieved portions" | "the unrelieved portions of the piston skirt wall" |

NISTAC modifies its proposed construction of "lands" to mean "the unrelieved portions of the piston skirt wall." NISTAC's construction is fully supported by the '919 and '955 patents which define "land" or "lands" as follows: "The unrelieved portion of the skirt wall becomes a land or lands 35 for sliding engagement along the cylinder bore wall." '919 Patent, 4:18-19; '955 patent, 4:17-18; FIGS. 4-6 of the '919 and '955 patents. Hence, the term "lands" refers to those parts of the piston skirt wall that are not fabricated to be of reduced diameter or removed by, for example, mechanical machining or electrical discharge machining.

Construing "lands" as "unrelieved portions of the piston skirt surrounding the relieved portions," as urged by the Defendants, is improper. There is no teaching or requirement found in

the '919 and '955 patents that the unrelieved portions *must* surround the relieved portions (i.e., the “surrounding” geometry limitation), and the Defendants do not and cannot point to any such requirement in the two patents. The '919 and '955 patents show various embodiments of the piston skirt wall in Figs. 4-6 with the unrelieved portions of the piston surrounding the relieved portions. However, the claim language or the teachings in the patent specification do not *require* that the unrelieved portions of the piston surround the relieved portions. Reading limitations from the embodiments disclosed in Figs. 4-6 into the claims is prohibited as it violates a basic canon of claim construction. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1323 (Fed. Cir. 2005) (en banc) (stating that a court should not read limitations from the patent specification into the claim terms). Even in situations where there is a single embodiment disclosed in a patent, it is improper to read limitations from that one embodiment into the claims. *Id.*; *Innova/Pure Water, Inc. v. Safari Water Filtration Systems, Inc.*, 381 F.3d 1111, 1120 (Fed. Cir. 2004). It is, therefore, improper to limit the definition of “lands” by importing the “surrounding” geometry limitation from the embodiments into this claim term. Even the Defendants note that the “surrounding” geometry limitation is merely “consistent with the friction reduction concepts described in the patents” (Defs. Opening Brief, p. 8), and it is not a requirement of the claim language or the teachings in the two patents.

This Court should reject Defendants’ attempt to improperly narrow the definition of “lands,” and should instead accept NISTAC’s proposed definition that is entirely supported by the specification, without importing limitations from the disclosed embodiments into this claim term.

b. “relieved” or “unrelieved” – found in the '919 Patent (Claim 1) and in the '955 Patent (Claims 1, 4, 9, 18, 22)

| Claim Terms | Defendants' Proposed Constructions | NISTAC's Proposed Constructions |
|---------------------------|------------------------------------|--|
| "relieved" / "unrelieved" | "cut away" / "not cut away" | No construction necessary. Alternatively, "of reduced diameter" |

NISTAC believes that these "relieved" and "unrelieved" do not require any construction for all the reasons outlined in NISTAC's Opening Brief. The claim term "relieve" or its past tense, "relieved," as it is used in the '919 and '955 patents, refers to areas of the piston skirt wall that are of reduced diameter. Hence, in the alternative, NISTAC believes that the term "relieved" can be construed to mean "of reduced diameter." However, Defendants improperly attempt to read in a requirement that the reduced diameter be as a result of "cutting."

Relief (*i.e.*, reduced diameter) can be accomplished by using fabrication techniques such as mechanical machining or electrical discharge machining. However, it is clear from the teachings in the '919 and '955 patents that these methods are merely illustrative and not meant to be limiting. Consider for example, the following excerpts from the '919 and '955 patents:

"FIG. 4 illustrates how the skirt wall is relieved at areas 30, 31, 32, 33 on one side of the piston. The relief *may* be carried out by mechanical machining [] or by electrical discharge machining." '955 Patent, 4:13-17; '919 Patent, 4:14-18. (emphasis added).

"The undercutting *may* be carried out by machining..." '955 Patent, 5:46; '919 patent, 5:47. (emphasis added).

Contrary to what the Defendants urge, it is clear that cutting away or undercutting is not *required* by the teachings in the two patents. Instead, it would be clear to a person of ordinary skill in the art that the patents merely provide examples of fabrication techniques that *may be* employed to "relieve" or render some areas of the piston to have a reduced diameter. *See* Exh.

A., Decl. of Dr. Richard Baron, Ph.D. P.E., ¶6. Moreover, a person of ordinary skill in the art, after reading the two patents, would be able to easily identify many other fabrication techniques, such as casting, to achieve “relief” in areas of the piston skirt wall. *See* Exh. A., Decl. of Dr. Richard Baron, Ph.D. P.E., ¶6.

It is improper claim construction methodology to read limitations from the patent specification into the claims. Hence, it is improper to read cutting away or undercutting from the patent specification into the claim term, “relieved.” *Phillips*, 415 F.3d at 1323; *Innova/Pure Water*, 381 F.3d at 1120. In other words, the claim term “relieved” should be defined in terms of what a relieved piston *is*, and not by *how* it is fabricated.

Moreover, in the context of this claim term “relieved,” it is also improper to read method limitations into apparatus claims. *Baldwin Graphic Systems, Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1344-1345 (Fed. Cir. 2008) (stating that courts must generally take care to avoid reading process limitations into an apparatus claim). In other words, it is improper to restrict the term “relieved” (which is the outcome of fabrication) to mean the same thing as particular *methods* of achieving that end result, namely “cutting away” or “undercutting.”

Cutting away is not necessary to facilitate the transfer of coating from the piston skirt to the cylinder bore wall, as urged by the Defendants. *See* Defs. Opening Brief, p. 6. Rather, it is a piston having relieved and unrelieved areas in the piston skirt wall that facilitates the transfer of the coating. The fabrication method employed to realize “relieved” and “unrelieved” areas in the piston skirt wall is irrelevant to facilitating transfer of coating from the piston to the cylinder. *See* Exh. A, Decl. of Dr. Richard Baron, Ph.D. P.E., ¶6. Thus, Defendants’ proposed constructions for “relieved” and “unrelieved” are unnecessarily restrictive, and should be rejected.

c. “reservoirs of oil” – found in the ’955 Patent (Claim 18)

| Claim Terms | Defendants’ Proposed Constructions | NISTAC’s Proposed Constructions |
|---------------------|---|--|
| “reservoirs of oil” | “relieved portions on the piston skirt that retain oil and are surrounded by lands” | No construction necessary. Alternatively, “oil that is retained in the relieved portions of the piston” |

NISTAC urges that there is nothing in this claim term that is different from its ordinary and common meaning. Indeed, any juror would have no trouble understanding this claim term. Alternatively, and still consistent with the teachings of the two patents at issue, NISTAC urges that “reservoirs of oil” refers to “oil that is retained in the relieved portions of the piston.”

Once again, Defendants seek to improperly import their “surrounding” geometry limitation into this claim term by defining “reservoirs of oil” as relieved portions on the piston skirt that both retain oil and are surrounded by lands. Nothing in the ’955 patent demands that Defendants’ unnecessarily restrictive limitation should be imported into Claim 18. As discussed above, the Federal Circuit has repeatedly rejected this approach as violating a basic canon of claim construction.

d. “relieved”/“unrelieved,” “reservoirs of oil,” and “lands” – Taken together

| Claim Terms | Defendants’ Proposed Constructions | NISTAC’s Proposed Constructions |
|---------------------------|---|--|
| “lands” | “unrelieved portions of the piston skirt surrounding the relieved portions” | “the unrelieved portions of the piston skirt wall” |
| “relieved” / “unrelieved” | “cut away” / “not cut away” | No construction necessary. Alternatively, “of reduced |

| | | |
|---------------------|---|--|
| | | diameter” |
| “reservoirs of oil” | “relieved portions on the piston skirt that retain oil and are surrounded by lands” | No construction necessary. Alternatively, “oil that is retained in the relieved portions of the piston” |

Summing up these three terms, Defendants argue that the terms “relieved”/“unrelieved,” “reservoirs of oil,” and “lands” are “as essential to meeting the stated objectives of the claimed inventions.” *See* Defs. Opening Brief, p. 3. This is simply not true. The term “essential” is nowhere to be found in the ‘955 and ‘919 patents. Indeed, the only term that comes close is “essentially” which is found in the Background of the Invention (e.g., ‘919 Patent, 1:49) where “essentially” is used not to discuss any feature or attribute of the invention. Rather, it is used to state that “[s]olid film lubricants have also been tried in reciprocating assemblies where there is essentially no oil lubrication supply...” ‘919 Patent, 1:48-50.

Defendants also argue that these terms “relieved”/“unrelieved,” “reservoirs of oil,” and “lands” are “necessary” to realize the benefits of the ‘919 and ‘955 patents. *See* Defs. Opening Brief, p. 4. The word “necessary” is also nowhere to be found in the ‘919 and ‘955 patents with one exception. In that case, the patents actually discuss why “grooves (straight or spiral) may *not* be necessary.” ‘919 Patent, 6:29-30.

Without letting up, Defendants also argue that the ‘919 and ‘955 patents state that reservoirs of oil are “critical” to oil retention and replenishment. *See* Defs. Opening Brief, p. 4. In making this claim, Defendants cite to the ‘955 Patent, 4:10-12. However, upon examination, the word “critical” is *nowhere* to be found in the specific citation provided by the Defendants.

The word “critical” is found only once in the ‘955 and ‘919 patents in the context of alternate embodiments involving alternative arrangements of the lands, as excerpted below:

Alternative arrangements of the lands can be as shown in FIGS. 5 and 6. The benefit of these alternative embodiments is to enhance the size and location of oil reservoirs during transient mode operation of the engine, such reservoirs being critical to the retention of the oil film to promote mixed and hydrodynamic lubrication.

‘955 Patent, 5:13-19.

Note that the word “critical” is used in this context to only indicate that the size of the reservoirs of oil can be enhanced, so that the reservoirs can help retain an oil film. There is no support for Defendants’ argument that the terms “relieved”/“unrelieved,” “reservoirs of oil,” and “lands” are critical to the patented inventions as a whole. Indeed, using the term “critical” in the context of *alternate embodiments* of the inventions is evidence that these features are *not* critical to the patented inventions in the ‘919 and ‘955 patents.

Undoubtedly Defendants would *like* for these terms to be “essential” or “necessary” or “critical” to the claimed inventions so that Defendants could import these terms into the claims in the claim construction process. However, doing so would skirt a basic canon of claim construction, that the Court should not read limitations from the patent specification into the claims. Defendants’ approach should be soundly rejected by this Court.

2. “solid film lubricant coating” – found in the ‘919 Patent (Claims 1, 2, 3, 7, 8, 11) and the ‘955 Patent (Claims 1, 6, 7, 8, 9, 14, 18, 22)

“solid lubricants” – found in the ‘919 Patent (Claims 2, 4, 9) and the ‘955 Patent (Claims 2, 18)

“solid film lubricant crystals” – found in the ‘919 Patent (Claims 3, 9) and the ‘955 Patent (Claims 9, 10)

| Claim Terms | Defendants' Proposed Constructions ¹ | NISTAC's Proposed Constructions |
|---------------------------------|---|--|
| "solid film lubricant coating" | Plain and ordinary meaning | "A coating that has lubricating properties and in solid film form with at least two crystals chosen from the group of graphite, boron nitride (BN), and molybdenum disulfide (MoS ₂), regardless of the existence of other crystals with lubricating properties." |
| "solid lubricants" | <p>Nissan, Toyota, and Subaru Defendants: "two or more solid lubricants"</p> <p>Honda Defendant: "graphite, molybdenum disulfide, and optionally boron nitride"</p> | <p>No construction necessary</p> <p>Alternatively, "lubricants in solid film form with at least two crystals chosen from the group of graphite, boron nitride (BN), and molybdenum disulfide (MoS₂), regardless of the existence of other crystals with lubricating properties"</p> |
| "solid film lubricant crystals" | <p>Nissan, Toyota, and Subaru Defendants: "crystals of two or more solid lubricants"</p> <p>Honda Defendant: "crystals of graphite, molybdenum disulfide, and optionally boron nitride"</p> | "Crystals with lubricating properties and in solid film form with at least two crystals chosen from the group of graphite, boron nitride (BN), and molybdenum disulfide (MoS ₂), regardless of the existence of other crystals with lubricating properties." |

¹ As set forth in their opening brief, even Defendants cannot agree among themselves to the proposed construction of the terms "solid lubricants" and "solid film lubricant crystals".

The disagreement among the Defendants over the meanings of these terms demonstrates that NISTAC's proposed constructions are the most reasonable and consistent with the '919 and '955 Patent specifications. The one area of these definitions where the parties do agree is that "solid lubricants" and "solid film lubricant crystals" require the presence of at least two of such crystals. *See* Defendants' Initial Claim Construction Brief, at pp. 10-12. Such agreement on the required number of "solid lubricants" and "solid film lubricant crystals" is supported by the patent specification, especially in the claims at issue. *See* '955 Patent, 9:42-44, 10:23-24, Claims 10 and 18.

Similarly, the term "solid film lubricant coating" should be interpreted to require any two of the three described solid film lubricants identified in the patent. The patentees acted as their own lexicographer when they limited the potential world of solid film lubricants in these claims to graphite, molybdenum disulfide, and boron nitride. '955 Patent, 4:36-37. The patentees then described different permutations of these solid lubricants to construct a "solid film lubricant coating." The patent describes how each of these combinations can be used to achieve some or all of the benefits of the patented invention. The patentees described solid film lubricant coatings comprised of graphite and molybdenum disulfide ('955 Patent, 1:55-58), and alternately the patent described alternative coatings comprised only of molybdenum disulfide and boron nitride. '955 Patent, 1:67-68, 4:46-50. This interpretation of the phrase "solid film lubricant coating" is further supported by the exemplary percentages listed in the specification. The patent lists potential percentages of graphite and molybdenum disulfide of up to 58% each, and of boron nitride of up to 16%. '955 Patent, 4:37-41. A coating could not contain graphite and molybdenum disulfide at the maximum percentages because the sum of those percentages—58%

+ 58%—would exceed one-hundred percent (100%) of the coating before the resin is accounted for. This demonstrates that the patent teaches using all of the possible combinations of the solid lubricants—graphite and molybdenum disulfide, graphite and boron nitride, molybdenum disulfide and boron nitride, or graphite, molybdenum disulfide, and boron nitride.

Contrary to Defendants' proposed definitions, however, the world of potential solid film lubricants is limited. The '955 and '919 patents repeatedly describe the specific solid film lubricants that must be present for the invention to work. *See* '955 Patent, Abstract (reciting graphite, MoS₂, and BN as the solid film lubricants); 1:56-58; 2:11-13, 4:36-27. The potential percentages of solid lubricants are listed *only for these three* compounds. '955 Patent, 4:37-41. The beneficial characteristics are described *only for these three* compounds. '955 Patent, 1:66-68, 5:41(referring to "low-shear crystals"), 4:45-53 (discussing the thermal and load-bearing characteristics of molybdenum disulfide and boron nitride). As such, the patents teach that "solid lubricants" and "solid film lubricant crystals" must include at least two crystals from the group containing graphite, molybdenum disulfide, or boron nitride crystals.

For these same reasons, Defendant Honda's proposed definitions are misplaced. The patents-at-issue discuss the available solid film lubricant crystals as including graphite, molybdenum disulfide, and boron nitride, but never *limit* the coatings to only those with graphite and molybdenum disulfide. As noted above, the patent describes varying combinations of crystals including graphite and molybdenum disulfide ('955 Patent, 1:56-58) and molybdenum disulfide and boron ('955 Patent, 4:45-53). Thus, Honda's proposed definition is in stark contrast with the description of the invention found in the patent.

Defendants' allegations regarding the doctrine of claim differentiation are unfounded. The '955 Patent and the '919 Patent discuss "solid film lubricant coatings" throughout and the

only “solid film lubricants” specifically disclosed are graphite, boron nitride, and molybdenum disulfide. ’955 Patent, Abstract, 1:56-58, 2:11-13, 4:36-27. These compounds can only be crystals when they are present in their solid form. *See* Exh. A., Decl. of Dr. Richard Baron, Ph.D. P.E., ¶ 7. As such every solid film lubricant coating contains crystals regardless of the claim in which it is referenced. Trying to define “solid lubricants” as something other than crystals is contrary to the teaching of the patents and what one of ordinary skill in the art would understand from reading the patents. *Id.* The doctrine of claim differentiation does not trump the teachings of the patents or what one of ordinary skill in the art would understand from reading them. *See O.I. Corp. v. Tekmar Co.*, 115 F.3d 1576, 1582 (Fed. Cir. 1997); *3D Sys. v. Envisiontec, Inc.*, 694 F. Supp. 2d 674, 694 (E.D. Mich.) (holding that “applies” and “dispense” have the same meaning despite the doctrine of claim differentiation, because the specification teaches that they have the same meaning).

Furthermore, the claims that use these phrases can be differentiated based on aspects other than the presence or absence of the phrase “crystals.” For example, Claim 10 of the ’955 Patent claims “[a] method of making a low-friction piston”, while Claim 18 of the ’955 Patent claims “[a] method of using a low-friction piston.” Further, Claim 10 of the ’955 Patent requires “spraying” the coating, which Claim 18 does not, and Claim 18 requires “operating said reciprocating assembly to transfer a portion of said solid film lubricant coating to the cylinder bore wall . . .”. Thus, the doctrine of claim differentiation does not compel the result that Defendants seek.

Defendant Honda’s reliance on *Honeywell v. ITT Industries* is misplaced. 452 F.3d 1312 (Fed. Cir. 2006). In that case, the court followed the repeated statements in the patent that limited the claimed term—“fuel injection system component”—to one specific component of the

system—the fuel filter—because the patent repeatedly referred to the invention as “a fuel filter.” *Id.* at 1317-1318. Unlike the patent in *Honeywell*, the patents-at-issue repeatedly describe the invention as being made of different combinations of the disclosed compounds, and do not limit the invention to *only* coatings with graphite and molybdenum disulfide. The ‘955 patent describes “a first aspect of this invention, a new piston construction is provided with a coating of solid film lubricant (SFL) comprising graphite and molybdenum disulfide in a resin.” ‘955 Patent, 1:55-58. The patent goes on to describe an alternative coating with “both molybdenum disulfide and boron nitride in roughly equal proportions within the lubricant.” ‘955 Patent, 4:45-47. This clearly teaches use of various combinations of the three compounds without imposing the restrictions that Honda suggests. This situation is more akin to that in *Durr Sys. v. Fanuc, Ltd.*, where the court refused to import limitations from the specification into the claims because the patent did not clearly indicate a desire to limit the invention to the preferred embodiment. 463 F. Supp. 2d 663, 677 n. 13 (E.D. Mich. 2006).

In sum, Defendants’ arguments regarding “solid film lubricant coating,” “solid lubricants,” and “solid film lubricant crystals” should be rejected, and NISTAC’s proposed definitions for these terms should be adopted.

3. “at least at regions of piston slap” – found in the ‘955 Patent (Claim 18)

| Claim Terms | Defendants’ Proposed Constructions | NISTAC’s Proposed Constructions |
|--------------------------------------|---|---|
| “at least at regions of piston slap” | “at each area where the piston skirt contacts the cylinder bore wall” | No construction necessary. Alternatively, “the regions where the piston skirt contacts the cylinder bore wall” |

For the reasons outlined its opening brief, NISTAC contends that this claim term, “at least at regions of piston slap” does not need any construction. In the alternative, NISTAC urges that the claim term “at least at regions of piston slap” be defined as “the regions where the piston skirt contacts the cylinder bore wall.” This definition is entirely consistent with the teachings of the two patents that the lubricant coating may be transferred from the lands (the unrelieved areas of the piston skirt) to the cylinder bore wall in the regions of piston slap. ‘955 Patent, 6:54-57; ‘919 Patent, 6:55-58.

Defendants urge that the term “at least at regions of piston slap” must be construed to mean “at each area where the piston skirt contacts the cylinder bore wall.” In other words, according to Defendants, this claim term must include “*each area*” of piston slap. There is no basis to add this additional limitation of “each area” to this claim term, since the patent does not require that there should be any such limitation. The two patents at issue do not require that the lubricant coating must be transferred from the lands to the cylinder bore wall at *each and every area* of piston slap, and defendants cannot point to any such teaching in the two patents at issue. Based on the precedent already cited in this Response brief, reading such a limitation into this claim term is plainly improper and should be rejected by this Court.

4. “asperities” – found in the ‘919 Patent (Claims 2, 9, 10, 12) and in the ‘955 Patent (Claims 10, 13, 15, 18)

| Claim Terms | Defendants’ Proposed Constructions | NISTAC’s Proposed Constructions |
|--------------------|---|--|
| “asperities” | “cavities formed by surface roughening” | No construction necessary. Plain and ordinary meaning. |

| | | |
|--|--|--|
| | | Alternatively, “small irregularities, imperfections or roughness.” |
|--|--|--|

No construction is necessary for “asperities” as this term has a well-known meaning within the art, and a person of ordinary skill in the art would understand its meaning from reading the patent. *See* Exh. A., Decl. of Dr. Richard Baron, Ph.D. P.E., ¶ 8.

The Defendants’ proposed construction adds unnecessary and improper limitations, such as “formed by surface roughening.” This unnecessary limitation misguidedly dwells on *how* the asperities were formed rather than *what* the asperities are. Defendants’ approach on how the asperities were formed is neither the focus of the patent claims in which that term appears nor the objective of the claim construction process. How the asperities are created is immaterial to the definition of this claim term. Thus, Defendants’ attempt to interject the unnecessary “formed by surface roughening” limitation is purely motivated to enhance their non-infringement positions, and does not comport with Federal Circuit precedent on the proper approach to claim construction.

To the extent that the patentees intended for the “asperities” to be made in a certain way or to have a certain appearance, the patentees specifically said so in certain patent claims. For example, Claims 2, 9, and 10 of the ’919 Patent recite additional limitations such as introducing a “predetermined pattern of asperities” (Claims 2 and 9 of the ’919 Patent) or “asperities are produced by use of acid etching” (Claim 10 of the ’919 Patent). But the patentees did not *always* add limitations to “asperities.” For example, Claim 12 of the ’919 Patent mentions “asperities”

without referring at all to how they are produced. The fact that certain claims of the '919 Patent use the term "asperities" with additional claim language defining *how* asperities are created is proof that the singular term "asperities" by itself does not incorporate any limitations regarding *how* they are created. The claims in the '955 Patent that use the term "asperities" such as Claims 10, 13, 15 and 18 are also very similar to the claims in the '919 Patent with respect to this claim term. Therefore, it is improper to read a particular method of creating asperities into this claim term, such as surface roughening, as urged by the Defendants.

NISTAC does not urge that the claim term "asperities" refers to only those irregularities that are a natural part of any surface, as suggested by the Defendants. Defs. Opening Brief, p. 18. Rather, NISTAC contends that *how* the "asperities" are created is not relevant to construing this claim term, and thus Defendants' proposed definition should be rejected.

5. "depth of asperities" – '955 Patent (Claim 18)

| Claim Terms | Defendants' Proposed Constructions | NISTAC's Proposed Constructions |
|-----------------------|---|--|
| "depth of asperities" | "average of the distances from the surface of the lands to the bottom of each asperity" | No construction necessary. Plain and ordinary meaning. |

If the claim term "asperities" is defined as discussed above, then NISTAC contends that "depth of the asperities," meaning the depth of irregularities or imperfections, simply follows from this definition because the term "depth" is used in ordinary sense of this word. *See* Exh. A., Decl. of Dr. Richard Baron, Ph.D. P.E., ¶ 9.

The hand wringing by Defendants about how they cannot determine a single or specific depth of the asperities from the '919 or '955 patents is not only incorrect, it is also of no consequence. A person of ordinary skill in the art after studying Figs. 10 and 11 and their related description in the '919 and '955 patents would readily understand that even though the depth of individual asperities may vary, the claim term "depth of the asperities" has an easily understood meaning as it is employed in Claim 18 of the '955 patent. The term "depth of the asperities" is used to indicate how thick the oil film thickness needs to be when compared to the depth of the asperities. Hence, this claim term has a readily understood meaning to one of ordinary skill in the art, and consequently, this claim term is definite. *See* Exh. A., Decl. of Dr. Richard Baron, Ph.D. P.E., ¶ 9. Thus, Defendants' arguments to the contrary should be rejected.

6. "microasperities" – '955 Patent (Claim 18)

| Claim Terms | Defendants' Proposed Constructions | NISTAC's Proposed Constructions |
|--------------------|---|--|
| "microasperities" | "cavities significantly smaller than the asperities in the lands" | No construction necessary. Plain and ordinary meaning. Alternatively, "microscopic irregularities, imperfections or roughness." |

As NISTAC has outlined in its opening brief, the claim term “microasperities” refers simply to asperities on a microscopic scale. Because the term “asperities” has been defined above, there is no need for any additional construction merely because the prefix “micro” was added to the previously defined claim term “asperities.” Also, it is readily apparent that the prefix “micro” was not used by the patentees in manner that is different from its plain and ordinary meaning. A person of ordinary skill in the art would readily understand from reading the patent that the microasperities must be smaller compared to the dimensions of the asperities. For example, Claim 18 of the ‘955 Patent requires that the lambda (“the ratio of the height of the oil film thickness to the depth of the asperities”) is 6 or greater. ‘955 Patent, 10:40:44; *see also* 6:57-60 (“lambda (λ) greater than 6”), 7:50-53 (“When λ is equal to or greater than 6, the lubrication regime will be hydrodynamic and the coefficient of friction will be less than 0.05”). The specification describes the oil film thickness as being 20-30 microns. ‘955 Patent, 7:40-45, 8:7-10). Hence, the depth of the asperities is around 5 microns or smaller. Microasperities necessarily must be smaller compared to the dimensions of the asperities. In other words, a person of ordinary skill in the art would have no difficulty understanding the term “microasperities” in light of how “asperities” are discussed in the patents at issue. *See* Exh. A., Decl. of Dr. Richard Baron, Ph.D. P.E., ¶ 10.

The Defendants’ contention that “there is no common understanding” of this term is simply inaccurate, given that the prefix “micro” is used in a plain and ordinary way to modify the root word “asperities.” Defs’ Brief, p. 20. As such, Defendants’ proposed definition should be rejected.

7. “**predetermined pattern**” – found in the ’919 Patent (Claims 2, 9) and in the ’955 Patent (Claims 9, 10, 18, 22)

| Claim Terms | Defendants’ Proposed Constructions | NISTAC’s Proposed Constructions |
|-------------------------|--|--|
| “predetermined pattern” | “an arrangement formed by a process and determined in advance” | No construction necessary. Plain and ordinary meaning. |

NISTAC contends that this term has a common and ordinary meaning, and no juror would need any further elucidation about the meaning of this claim term. In addition, the patents at issue do not provide a specialized or unique meaning for this term outside its commonly understood meaning. As such, this claim term needs no further construction.

The asperities or grooves might indeed have a predetermined pattern as recited in Claims 2 and 9 of the ’919 Patent and in Claims 9, 10, 18 and 22 in the ’955 Patent, depending on how the grooves and asperities are created. The ’955 Patent, for example, teaches that the asperities may be created by acid etching, low pressure grit blasting or by using a hard stainless steel wire wheel (’955 Patent, 5:49-57), and the pattern of asperities or grooves that are created is a consequence of the process employed. This does *not* mean, as Defendants contend, that the predetermined pattern must *always* be determined in advance before choosing a particular fabrication method. Indeed, the resulting pattern is simply a consequence of the fabrication method chosen. We know this is true because the ’955 Patent specifically contemplated that randomness is inherent in the creation of the asperities by the acid etching method. ’955 Patent, 5:49-54 (“the asperities will be randomly located as a result of such acid etching”). If the pattern

of the asperities can be random resulting from the use of the acid etching method, then “predetermined” must not mean, as Defendants contend, that the pattern is determined in advance of its formation. A person of ordinary skill in the art would agree with NISTAC’s contention here. *See* Exh. A., Decl. of Dr. Richard Baron, Ph.D. P.E., ¶ 11. Thus, the inventors’ own specific contemplation that the appearance of the asperities could be random is by itself fatal to Defendants’ proposed definition.

8. “shallow pockets” – found in the ’919 Patent (Claims 2, 9) and in the ’955 Patent (Claim 10)

| Claim Terms | Defendants’ Proposed Constructions | NISTAC’s Proposed Constructions |
|--------------------|---|---|
| “shallow pockets” | “dimples in the coating” | No construction necessary. Plain and ordinary meaning. |

The Defendants are improperly importing limitations from the specification in asserting that “shallow pockets” should be defined as “dimples in the coating.” As explained in NISTAC’s opening brief, the Defendants’ construction is not proper because, although “shallow pockets” *can* consist of dimples in the coating in some instances, “shallow pockets” are *not required in all instances* to be dimples in the coating. Although the specification refers to dimpling in the limited context of discussing the preferred embodiment, the preferred embodiment alone does not dictate the metes and bounds of the claim terms. *See CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) (“An accused infringer may . . .

narrow a claim term's ordinary meaning, but he cannot do so simply by pointing to the preferred embodiment or other structures or steps disclosed in the specification or prosecution history.”).

The inventors did not require “shallow pockets” to be dimples in *all* instances. For example, *compare* independent Claim 10 of the '955 Patent at 9:49-50, which states, “forming **shallow pockets** at the mouth of said asperities” *with* dependent Claim 15 at 9:65-68, which states, “pockets in said solid film lubricant at the mouth of said asperities are created by brushing to remove and **dimple** the solid film lubricant at such mouths.” (emphasis added).

A person of ordinary skill in the art would understand that in the context of the patents at issue, “shallow pockets” do not always mean dimples in the solid film lubricant coating, and instead can mean dimples or other forms of shallow depressions besides dimples. *See* Exh. A., Decl. of Dr. Richard Baron, Ph.D. P.E., ¶ 12. Thus, Defendants' proposed definition is overly restrictive and should be rejected.

9. The claim terms “low-friction” and “providing a low friction piston” in the ‘919 and ‘955 patent are definite

Defendants completely ignore many details in the patents-at-issue and the extrinsic evidence to argue that the terms “low-friction” and “providing a low friction piston” are indefinite. What falls within the realm of “low friction” is explained throughout the patents. In several places, the patents describe what coefficient of friction is covered by the patented invention. For example, the '955 patent states that one embodiment of the invention achieves a “total coefficient of friction in an oil-fed system [that] has been measured to be 0.03-0.06 in the boundary/dry lubrication region.” '955 Patent, 5:6-8. Furthermore, Figure 15 is a Stribeck diagram demonstrating how friction is affected by various factors—absolute viscosity, speed,

and unit load—and identifying that the invention of the patent keeps the piston skirt’s coefficient of friction below 0.1 when operating in the hydrodynamic regime. ‘955 Patent, Fig. 15, 5:5-11. Recalling the various possible friction regimes that were described in NISTAC’s technology tutorial, these statements in the ‘955 patent demonstrate what the patents-at-issue teach as being a low-friction piston assembly during each of the possible friction regimes—boundary, mixed, and hydrodynamic.

That a person of ordinary skill in the art would share this understanding is further supported by the extrinsic evidence. For example, manufacturers that market and sell piston coatings designed to reduce friction tout the “low-friction” characteristics in their market literature by stating a coefficient of friction for their products. *See* Exh. H to NISTAC’s Opening Brief, Sandstrom Technical Information Guide: Piston Skirt Coating series E720 (2002) (coefficient of friction ranging from 0.03 to 0.06); Exh. I to NISTAC’s Opening Brief, Dow Corning Product Information for Molykote 7409 (1995) (coefficient of friction (LFW-1) after running in 0.03), Molykote D 10 (1996) (coefficient of friction after running in $\mu < 0.1$), and Molykote PA-744 (2004) (coefficient of friction . . . 0.045).

The most relevant extrinsic evidence, however, are the papers published by the inventors of the patents-at-issue. *See* Exhibit M to NISTAC’s Opening Brief, V.D. N. Rao et al., Engine Studies of Solid Film Lubricant Coated Pistons, SAE Technical Paper Series 970009 (1997); Exhibit L to NISTAC’s Opening Brief, Rao, et al., Influence of Surface Characteristics and Oil Viscosity on Friction Behavior of Rubbing Surfaces in Reciprocating Engines, Paper No. 98-ICE-131 ASME 1998. Those papers analyzed the friction performance of the invention embodied in the patents-at-issue as indicated by the fact that both papers specifically referred to the ‘955 Patent. *See* Engine Studies at n. 5; Influence of Surface Characteristics, at n. 15.

Those publications repeatedly refer to pistons with coefficients of friction of 0.08 or less as having “low friction.” See Engine Studies at Table 1; Influence of Surface Characteristics, at 32. This demonstrates that the inventors and those of ordinary skill in the art would understand that “low friction” means a coefficient of friction of less 0.10, and that “providing a low friction piston” means providing a piston with a coefficient of friction of less than 0.10. See also Exh. A., Decl. of Dr. Richard Baron, Ph.D. P.E., ¶¶ 13-15.

Further, Defendants’ argument that the patent does not teach how to measure friction also fails. To a person of ordinary skill in the art, the coefficient of friction is extremely well known. *Id.* at ¶ 14. Measuring the coefficient of friction is likewise extremely well known, as demonstrated by the fact that as of 1988 the American Society of Testing and Materials (ASTM) had developed a standard method for measuring friction. *Id.*; Exhibit K to NISTAC’s Opening Brief, ASTM D 2714-88 STANDARD TEST METHOD FOR CALIBRATION AND OPERATION OF THE FALEX BLOCK-ON RING FRICTION AND WEAR TESTING MACHINE (1988); see also Exhibit N to NISTAC’s Opening Brief, Stephen H. Hill et al. Bench Wear Testing of Common Gasoline Engine Cylinder Bore Surface/Piston Ring Combinations, 39 Tribology Transactions 929 (1996); Engine Studies; Influence of Surface Characteristics. One of ordinary skill in the art would understand from the patents-at-issue that the coefficient of friction could be measured in one of many ways, but that it would fall within the ranges taught by the patents. See Exh. A., Decl. of Dr. Richard Baron, Ph.D. P.E., ¶ 15. Thus, Defendants’ arguments to the contrary should be rejected.

III. CONCLUSION

For the forgoing reasons, NISTAC respectfully requests that the Court adopt each of its proposed constructions of the disputed terms in the claims of the '955 and '919 Patents.

Respectfully submitted,

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UNITED STATES DISTRICT COURT FOR THE
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

NATIONAL INSTITUTE FOR STRATEGIC
TECHNOLOGY ACQUISITION AND
COMMERCIALIZATION (NISTAC)

Plaintiff/Counter-Defendant,

CASE NO. 2:11-cv-11039-GCS-LJM

v.

HON. GEORGE C. STEEH

FUJI HEAVY INDUSTRIES, LTD.
SUBARU OF AMERICA, INC.
TOYOTA MOTOR SALES U.S.A., INC.
TOYOTA MOTOR ENGINEERING &
MANUFACTURING NORTH AMERICA, INC.
AMERICAN HONDA MOTOR CO., INC.
NISSAN NORTH AMERICA, INC.

Defendants

and

NISSAN NORTH AMERICA, INC.
NISSAN MOTOR CO., LTD

Defendants/Counter-Plaintiffs

CERTIFICATE OF SERVICE

CERTIFICATE OF SERVICE

I certify that on November 22, 2011, I electronically filed the foregoing paper with the Clerk of the Court using the ECF system which will send notification of such filing to the following: Peter J. Brennan, Edward K. Chin, Derek T. Gilliland, Reginald J. Hill, Gregory A. Lewis, John F. Rabena, Paul Richard Steadman, Lawrence C. Mann, Paul T. O'Neill, and Jamie K. Stewart. Those parties not served via ECF have agreed to and will be served via e-mail.

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